Biography of a Business

TENNESSEE COAL & IRON DIVISION
UNITED STATES STEEL CORPORATION

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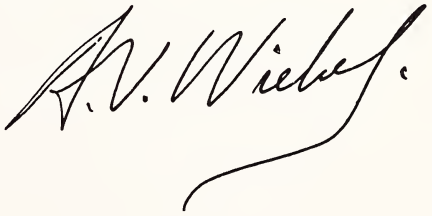
Preface

IN 1960, the TENNESSEE COAL & IRON DIVISION OF THE UNITED STATES STEEL CORPORATION celebrates its 100th year of service to the people of the South. Thus TCI – as it is familiarly known to millions of Southerners – is older by some 40 years than its parent corporation. Although TCI actually came into being in 1860, it is a direct descendent of earlier enterprises which date back to 1852.

The company had its genesis in the Cumberland Mountains of Tennessee, which explains the "Tennessee" in its name, and began as a simple coal mining venture. Its earlier years, and in fact its first half century, marked a period of adversity which many times threatened its collapse.

That TCI survived to become the South's major steel producer is tribute enough to those daring pioneer businessmen who time and again risked their capital and their standing as industrialists to pull it back from the brink of disaster. But because they so typically represented the American spirit of free enterprise and business venture, this history of the division is dedicated to their memory.



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A Century of Service

HOW MUCH IS 100 YEARS? To geologists, who reckon the age of the earth in millions of centuries, it isn't much. To anthropologists, who trace the development of the human race through millions of years, it is hardly worth mentioning. To historians, who probe back through the ages to piece together the pattern of an evolving civilization, it is of no great account.

In terms of time, one century is but a tiny unit. In terms of accomplishment, it can be great almost beyond calculation. During the past five generations, man has advanced technologically farther and faster than he had in all previous recorded history. In its struggle to understand and to turn to its own uses the world in which it lives, humanity in this short space of time has moved forward at a pace which is nothing short of miraculous.

By tearing apart, recombining and reshaping the elements of air, earth and water, man has extended a millionfold those weak animal powers with which nature endowed him. By wresting away nature's most closely guarded secrets and fitting them to his own purposes, he has put wings on his feet. He has conquered time and space. He goes where he will on land, through the air, on or under the sea, with swiftness no living creature has ever before come near to achieving. He throws his voice around the world with the speed of light. He lives in ease and comfort which even his great-grandparents could not have conceived. He has extended his average lifetime by many, many years.

All this has come about because men have learned to join together their individual knowledge, skills and imagination in a cooperative effort to create and to build. Joint creative

undertaking through free individual participation – which we call modern industry – has made this man's golden century.

It was at the beginning of the modern industrial era that the South's largest steel producer, one of the great manufacturing establishments of the nation, had its origin. The Tennessee Coal & Iron Division of United States Steel Corporation has been an integral part of the unfolding industrial drama of our time. Through repeated changes of name, ownership and function, it has grown to meet the expanding requirements of a fast advancing world.

Today, after a century of progress, TCI's products are shipped daily to points throughout the South, to find their way eventually to the farthest outposts of the Western world. Its employees are counted in the thousands and its owners, stockholders in United States Steel Corporation, number in the hundreds of thousands.

But this has not always been so. This enterprise which now contributes so much to the economic welfare of America was for many years a financial weakling, an industrial ugly duckling that only through many decades of skillful management by optimistic and persevering men was led to the realization of its potential greatness.

Sewanee Mining Company

1852 – 1860

BY BIRTH, TCI is a hillbilly. It traces its humble beginning to a place far back in the Cumberland Mountains of Tennessee. The exact spot of its origin was a fox hole in the wildest of Tennessee's virgin forests.

In 1850, Leslie Kennedy, a young Irishman from Nashville, made a trip through that rough and sparsely settled region in the Cumberland Mountains between Nashville and Chattanooga. He had no idea what was to be found in this wilderness; in fact, few people knew what lay between the two cities, because the country was so wild and the terrain so rough that few people ventured into this territory. But a new railroad was to be built between Nashville and Chattanooga, and where new routes of transportation were opened in this undeveloped country, business opportunities were bound to spring up. Ambitious young Leslie Kennedy was not one to take business opportunities lightly.

After many days of wandering about the mountains, Kennedy found the promise he had been seeking. High on a ridge, he practically tripped over his opportunity – a seam of coal that broke through the topsoil. He was elated with his discovery. Back to Nashville he hiked, in high hope of finding someone with the daring and the financial backing to help him exploit his find. But the businessmen of that city were surprisingly indifferent to Kennedy's propositions. Grown conservative, perhaps, with their success in established businesses, they were not enthusiastic about investing their capital in a new venture.

Only one man, William N. Bilbo, showed any real interest.

The people of Nashville were not particularly surprised that this picturesque lawyer should become involved in what they considered a visionary scheme. So, while Nashville sat back with an indulgent chuckle, Kennedy struck out into the woods again, this time accompanied by Bilbo, so Bilbo could see for himself what Kennedy claimed was the opportunity of a lifetime.

High on the Cumberland Plateau, they came across a mountaineer – a man named Wooten – digging coal from the ground. He took it to town, Wooten said, and sold it to the blacksmiths for use in their forges. Not a bad way to make a living. How did he find the outcrop? Wooten's boys were great hunters. One day while they were out looking for game, the dogs flushed a fox. Off up the mountain went the fox, with the dogs in close pursuit. When the boys caught up with them, the fox had taken refuge in a hole under a poplar stump. Trying to dig him out, they uncovered a mass of black rocks directly under the stump. They loaded their pockets with these peculiar stones and took them home to their father. Wooten knew coal when he saw it. He knew a good thing when he saw it, too. So in short order he began to dig the coal from the outcrop and peddle it to the various smithies in the region. There and then, Kennedy and Bilbo acquired a large section of land in the area, some for as little as a few cents an acre, and, in some cases, as an outright gift. Previous owners believed that those rugged slopes were not worth the few dollars a year they cost in taxes.

After acquiring the property, Bilbo went to New York and returned with five men. Four were men with money to invest; the other a civil engineer. After the land had been carefully inspected, the New Yorkers purchased it from Bilbo for $50,000. The eccentric lawyer thereupon retired from mineral speculation, content to live on the proceeds of his venture. The

Here is where it all started. From this coal mine, at Tracy City, Tenn., grew the South's largest steel producer – the Tennessee Coal & Iron Division of the United States Steel Corporation.

knowing smiles of his contemporaries had turned to expressions of chagrin. Still later developments were to prove that several hitherto reluctant capitalists were now willing and even eager to invest in what was originally considered a foolhardy scheme.

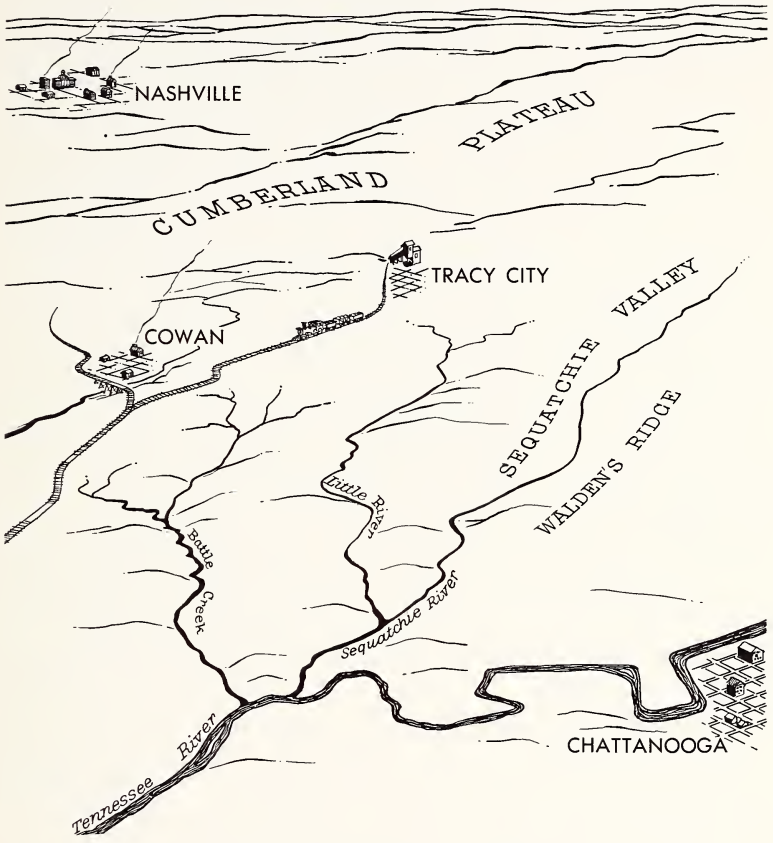
The New York group, headed by Samuel F. Tracy, obtained a charter from the Tennessee legislature in 1852, and began operations as the Sewanee Mining Company. "Sewanee," meaning big mountain, was a term the Indians had applied to the region. Tracy was the first president of what was later to become the Tennessee Coal & Iron Division of United States Steel Corporation. The original intention was to mine a coal seam on the Cumberland Plateau some 10 miles from Cowan, Tenn., the nearest town through which the new N. C. & St. L. Railroad passed. In order to move the product to market, it would be necessary to build a railroad through the hills to Cowan.

Because of the rugged topography, building the railroad to the mine site was an expensive and laborious undertaking. Much grading and filling was necessary before the line was completed in 1855, with the first coal being shipped over it in the following year.

But now came the first of a series of disappointments for the operators. Soon after they opened their mine, it was discovered that the coal seam was thin and covered only a small area. The only practical course was to abandon this shaft and open another 10 miles farther back in the plateau. This involved laying 10 more miles of track, an expensive item for the investors who had already dug deep into their resources to open the first mine.

By heavy borrowing, the extension was financed, and a new shaft was sunk at a spot which the company named Tracy City, after its president. Late in 1858, the first carload of coal

TENNESSEE AREA 1860



When TCI came into being in 1860, its operations were limited to the towns of Cowan and Tracy City, deep in the Cumberland Mountains between Nashville and Chattanooga. These towns had grown up around the coal mining operations of TCI's predecessor, the Sewanee Mining Company.

was shipped from Tracy City. And almost immediately, the owners found themselves in a second and even deeper dilemma. In their preoccupation with problems of production and financing, they had failed to take into consideration the most important aspect of their enterprise: marketing their product. They could produce two carloads of coal a day. But Tennessee was still a rural state. Its economy was based almost entirely upon agriculture. As in the rest of the pre-Civil War South, its industry was of little consequence. The huge log fireplace was the principal source of household heat. Even railroad locomotives were still burning wood. Therefore, there was no market even for the two carloads of coal per day which were rolling across the mountains from Tracy City.

That, coupled with the fact that many of the men who owned and operated the company had little or no knowledge of mining and minerals, almost spelled doom for the little enterprise. Competent labor was so scarce as to be practically non-existent, and worried creditors, who had financed construction of the railroad, took legal action to collect on their investments.

The upshot was that the courts rendered a series of verdicts bringing about the judicial sale of the property, and the title of all of the assets passed to the creditors.

Tennessee Coal and Railroad Company

1860 – 1881

IN AN ATTEMPT to salvage the investment of the original group, Tracy brought about a reorganization of the company, to include the principal creditors, a number of the original owners and some other businessmen, who could both bolster its financial standing and bring to it the technical know-how so badly needed in its operation. As a result, assets passed to a new corporation in 1860, which took the name, Tennessee Coal and Railroad Company. The old Sewanee Mining Company was no more.

In the meantime, Leslie Kennedy, who had made the discovery which led to the establishment of the original company, had remained as one of its employees, attaining the rank of mining superintendent. Soon after the reorganization he resigned, having acquired with his earnings a small farm adequate to support him and his family.

The first board of directors of the new company was composed of 10 men from New York and two from Tennessee, with Thomas Richardson, of New York, as president. Thus it appears that the Tennesseans, once practically unanimous in their disdain of Kennedy's dream, were no longer entirely skeptical.

Almost before the new company had had time to entrench itself firmly, the War Between the States intervened and the Confederates expropriated the property. For approximately a year the Southern Army operated the mine after a fashion, and when Union forces pushed the Confederates out of middle

Tennessee, these, in turn, took over. Although the Confederates took with them all the movable equipment of the railroad, the Federals worked the mine to provide their own fuel requirements until the end of the war in 1865.

Before the Sewanee Mining Company lost its original identity, however, its directors took action which was destined to keep alive the historic name.

In the early 1850's, it had been decided by a group of Episcopal Church officials and lay leaders to establish a religious college, in order to meet an extreme need for higher education in the South. The church, however, was not in financial position to undertake such an expensive project without outside help. So, in 1857, coincident with the beginning of its own productive operations, the Sewanee Mining Company donated to the church 10,000 acres of mountaintop land upon which to build a university. The gift of the property was made on condition that the college be opened within 10 years. Committees of the church went promptly and enthusiastically to work to collect funds for buildings and an endowment, and by 1860 the cornerstone of the main building was laid. This was to become the University of the South, familiarly known throughout the nation as "Sewanee."

But just as the War Between the States disrupted the operations of the Sewanee Mining Company, so did it put a temporary halt to ambitious plans for this seat of religious and cultural education. The fighting had been heavy on the fortress-like mountaintop, and by the time peace was restored, nothing remained of the University of the South but its charter and its extensive campus. Even though the hard days of Reconstruction were bringing vast social and economic changes, and while organizations as well as individuals were finding it difficult to pick up where they had left off at the outbreak of the war, the church was not willing to give up its

Before the development of highly efficient coke batteries, with chemical recovery equipment, coke was made in structures of stone and earth, called "beehive" ovens. These long batteries of ovens were located at TCI's old Blocton, Ala., coal mines.

plans for a college. Now, more than ever, there was a crying need for the civilizing influence of such institutions.

In order to keep the terms of the contract with the mining company, a log cabin schoolroom was built on the site and three mountain boys were taken in as students. This rustic hall of learning came to be known as "Rebel's Rest."

The first president of the University of the South was General Josiah Gorgas, famous soldier, industrialist and educator. He was the father of General William Crawford Gorgas, of Panama Canal renown.

When the owners of the Tennessee Coal and Railroad Company returned to claim their mine after the war had been concluded, they found a shambles at Tracy City. As has been mentioned, the Confederate Army had confiscated rolling stock and much working equipment when it retreated from Tennessee. The Union forces had been just as thorough in their exploitation of the property. They had gone about operating the mine in such an unscientific manner that the shaft was no longer a safe place in which to work. To all practical appearances, little remained of the company but its debts. These by the standards of the day, were enormous.

Great sums of money were owed to creditors both in Tennessee and in New York. Both groups claimed rights to the property as forfeit for the capital advanced by them. Deciding precedence of legal claims was a judicial problem of considerable magnitude.

The courts were of less than no help. Tennessee creditors took the case to the state courts, and in 1866 the Tennessee Supreme Court issued a decree for the sale of the company. That was the signal for the Southern creditors to bid it in for the money owed to them. They immediately did so. But almost simultaneously the New York creditors were able to obtain a decree of sale from a Federal court, and they, too, became the

purchasers. Thus two groups became claimants to the property, each with a court order to back it up.

At this point, flamboyant Col. Arthur St. Clair Colyar, Tennessee newspaperman, writer and lawyer, entered the case. Already widely known for his ability to sway men by his eloquent speech, he rose to his best in persuading the Northern group to yield the property and take first mortgage bonds as full payment for their claims against the company. To pay the sum owed to the Tennessee claimants, $400,000 worth of stock was issued, and held in escrow. When the debt was paid, the stock would be distributed on a pro-rata basis to those who paid it.

Then Col. Colyar, liquidating all of his own assets, paid off the debt and became president and sole owner of the company. This was the climactic demonstration of oratorical and financial wizardry of the man who, it has been alleged, once threw the City of Nashville into receivership.

Now the company was almost back where it started, financially, because Colyar, having expended all his wealth in acquiring the property, found himself in possession of a badly run-down mine but with no capital with which to rebuild. Furthermore, it was found that the titles to most of the land the Sewanee Mining Company had thought it owned were defective, making it necessary to purchase the property for a second time. But, while he may have lacked for money, Col. Colyar was not without means. Again he brought into play his keen understanding of human psychology. He staged another verbal coup, once more pulling the company out of an extremely precarious position.

He was well known, well liked and well respected in Nashville, and when he had something to say, people listened with confidence. So when he began to talk with enthusiasm about his mining company and its great prospects, other business-

men took careful note of his words. Among those was A. T. Duncan, Nashville bank president. After hearing Colyar's optimistic forecasts concerning the future of the Tennessee Coal and Railroad Company, Duncan became eager to have a part in this bold venture. He invested heavily in the company and persuaded other Nashvillians to do likewise. Another reorganization followed. Colyar stepped down as president and Duncan took his place.

While this financial transfusion saved the life of the company, it by no means effected a cure of its monetary ills. Although production was resumed, coal sales still did not bring in the anticipated income, and the treasury did not even yield enough to pay the taxes.

At one point, the sheriff of Grundy County attempted to confiscate the mine mule, Kate, in lieu of $16.40 in delinquent taxes. From a production standpoint, Kate was considered the most valuable piece of equipment the company owned, and it was generally agreed that, should she be removed, the mine would have to be closed.

Fortunately for the company, Kate had ideas of her own on the subject. When the sheriff clambered onto her back and tried to ride off, she stood firm in her tracks. Neither coaxing nor whipping could make her budge. The harder became the struggle between the sheriff and the immovable Kate, the broader grew the grins on the faces of watching employees.

In the meantime, a company official had scoured the countryside, and, by borrowing a dollar here and a couple there, had scraped enough together to make the payment. The sheriff went back to the courthouse and Kate, now docile and obedient, went back to work.

For the next few years, the presidency of the company switched back and forth from one stockholder to another. Production and financial problems continued to press hard.

TENNESSEE AREA 1880

By 1880, TCI had grown and expanded in the Cumberlands to include several coal mines, extensive coke-making facilities and blast furnaces for the manufacture of iron. New communities had come into being throughout the area to support the expanding company.

Demand for coal began to expand slightly, and production was raised.

Nevertheless, the volume of sales remained far below that necessary to insure solvency, and the managers were unable to keep outlay below income. Col. Colyar, when he first took over the mine, hired his former slaves to dig coal. For a period, convict labor worked in the mine pursuant to arrangements with the State of Tennessee, which were customary at that time.

By 1873, coal production had increased to 84,385 tons a year, but still there was not an adequate market. Industry had not yet gained a foothold in the South, and, although much more coal was being used for household heating and cooking, customers were few and small.

Most of the management at that stage were greatly discouraged. They questioned the wisdom of continuing to sink money and energy into a clearly losing proposition. The ebullient Col. Colyar was the only man who maintained his optimism. Once more the power of his rhetoric was sufficient to persuade his associates, and it was agreed to continue operations in hope that demand might eventually be increased to meet the mine's full production capacity.

In the meantime, something had to be done with the coal being mined. If it could not be marketed as such, perhaps it could be sold as coke, for use in the few Southern blast furnaces then in existence. No one in the company knew anything about making coke, nor did they understand the principles involved in building the necessary facilities. To learn the fundamentals of the business, two officers were sent to the great coal production centers of the North.

After the necessary information had been obtained, 100 beehive coke ovens were built. It was found that in these ovens Sewanee coal could be refined to coke of excellent quality.

This was "The Fiery Gizzard," crude experimental blast furnace built almost a century ago by the Tennessee Coal and Railroad Company, to determine whether its coke was of suitable quality for making iron. The furnace could produce only five tons of iron a day, and after three days the stovepipe fell. But the short-lived experiment led the company into the iron business, from which it grew to be the South's largest steel maker.

A by-product of this expansion into coke manufacture was a tentative fling at iron smelting. In order to test the quality of the coke, one of the company's employees built a small blast furnace. It was a makeshift affair, made principally of sandstone pieced together with such odds and ends as an oil drum, blacksmith bellows and stovepipe. Its capacity was five tons a day. The little group assembled to witness its trial were gleeful when they found it worked. As the first white-hot stream of metal gushed forth, one of the party dubbed the furnace the "Fiery Gizzard."

The furnace represented a valiant try, but was totally inadequate to the job that was expected of it. On the third day, after 15 tons of iron had been produced, the stove pipe came tumbling down. Even though the Fiery Gizzard's campaign was short-lived, this first furnace was by no means an ignominious failure. It proved that iron could be made successfully using Tennessee coke, and that the Tennessee Coal and Railroad Company could produce it. That experiment was eventually to have far-reaching effects upon the development of the company.

Persevering and ingenious as the little group was, however, it was not able to solve its financial problems. The result was that in 1880 the property once again was taken over by creditors.

The inevitable reorganization took place. Thomas O'Connor and W. H. Cherry, of the firm which had leased the convicts to the mining concern, along with Alfred M. Shook and William Morrow, Tennessee state treasurer, became the new owners. Mr. Morrow was elected president.

By this time, other businessmen were taking cognizance of the fact that great potential wealth lay in Tennessee's coal and iron ore deposits. Among them was James Bowron, an Englishman who had come to the hill country with the idea

of building up an industrial empire with English capital. He organized the Southern States Iron and Land Company, at South Pittsburg, Tenn.

This growing interest encouraged the new owners of the Tennessee Company—as it soon came to be called—to take up where their predecessors had left off in the matter of iron production. Almost immediately upon assuming the presidency, William Morrow purchased more land and organized the Sewanee Furnace Company. He ordered the construction of a 50-ton blast furnace, at a cost of $100,000. The furnace company was shortly merged with the Tennessee Company. The company by now was operating four coal mines at Tracy City, and the blast furnace was operated on coke made from the production of those mines.

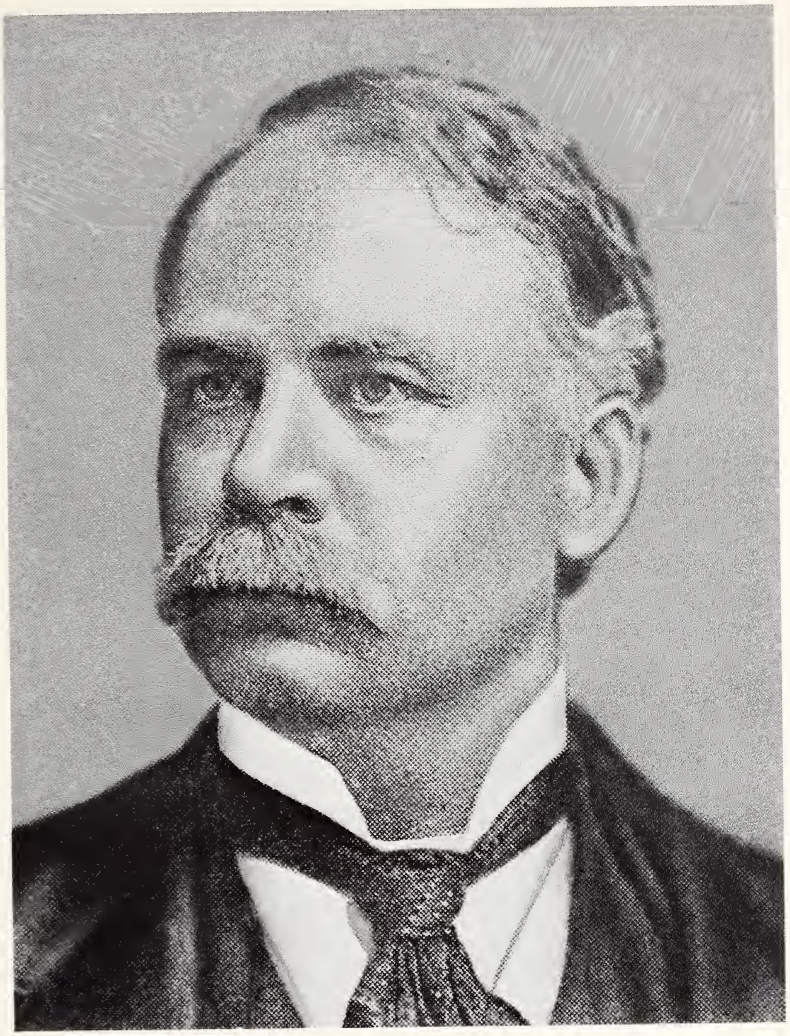
Tennessee Coal, Iron and Railroad Company

1881 – 1952

MORROW HAD BEEN president for only about a year when another change in ownership occurred. John H. Inman, who had accumulated a great deal of money as a cotton broker, bought the controlling interest. He brought with him into the business Nathaniel Baxter, Jr., president of a Nashville bank, and placed him temporarily in the presidency. The company again reorganized, changing its name to Tennessee Coal, Iron and Railroad Company, then acquired the Southern States Iron and Land Company.

At this point, one of the most picturesque men in the history of the Tennessee Company came on the scene. This was Col. Enoch Ensley, another businessman who, like Bowron, had visions of the great financial success which could be achieved by industrialization of the South. Hearing of the negotiations of Inman and Baxter, he attempted to make himself a party to the deal. He failed, however, and left in a huff to try to find better luck down in Alabama.

In Alabama, many other would-be industrialists had for some years been endeavoring to build successful businesses based upon the rich mineral deposits to be found in various parts of the state. The most important mineral beds lay in Jefferson County, in the vicinity of the site where now stands the city of Birmingham. Here closely associated were all of the elements needed for iron manufacture. The Warrior Coal Basin supplied good quality coking coal; the Big Seam of the Clinton Iron Ore formation, which reaches its southern termi-



Nathaniel Baxter, Jr., a Tennessee lawyer, served as president of TCI four times during its years of phenomenal growth and concurrent financial difficulties. He held the office in 1881, from 1883 to 1886, from 1887 to 1889 and from 1893 to 1902. It was in the latter period that TCI began the commercial manufacture of steel.

nus in the Appalachian foothills in Alabama, yielded huge quantities of hematite; and everywhere could be found large deposits of limestone and dolomite.

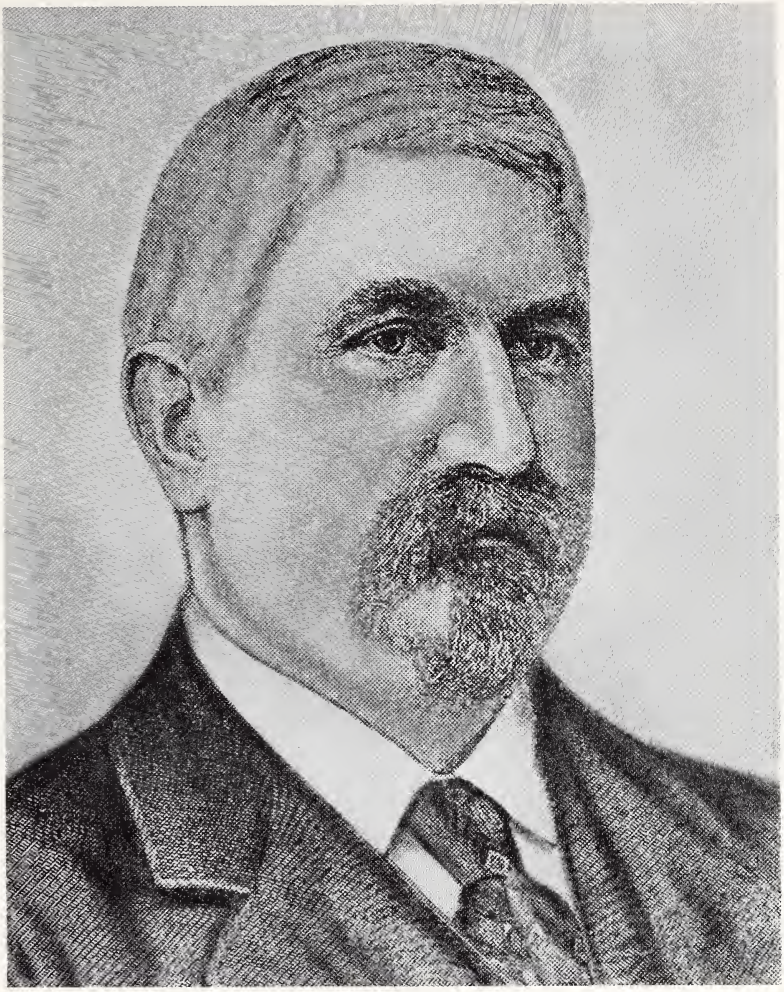
Many small mining companies and some iron manufacturing plants had sprung up only to die or to lose their separate identities through mergers. A few individuals and companies had consolidated groups of these smaller concerns, thus accumulating large holdings under single ownership. One such was the Pratt Coal and Coke Company, which held vast acreages of mineral lands and operated many beehive coke ovens. It was this firm which Ensley purchased, thereby completing the first million-dollar business deal in the state.

To these holdings he added, through further negotiations, the Alice Furnace Company and the Linn Iron Company.

Ensley had not been long in control of the company, which he renamed the Pratt Coal and Iron Company, before he was approached by two men who asked to buy an option on the concern. These were Col. Alfred Montgomery Shook, formerly general manager of the Tennessee Company, and T. T. Hillman, who had lost his control of the Alice Furnace Company when Ensley added it to his budding industrial empire. The proposition was an attractive one, and Ensley accepted. Hillman and Shook then resold their option to the Tennessee Company.

Through this amalgamation the company, in addition to its properties in Tennessee, came into ownership of 76,000 acres of coal lands, 460 coke ovens, two blast furnaces and about 13,000 acres of land containing seven and one-half miles of the outcrop of the Red Mountain iron ore seam.

Transfer of ownership to the Tennessee Company came on December 28, 1886. Enoch Ensley became president of the entire concern, and he and his associates set about to build an iron manufacturing concern which would rival in size the



It was colorful, ambitious Col. Enoch Ensley who was responsible for TCI's transfer of operations from the Cumberland Mountains to the Birmingham district. In Alabama's first million-dollar transaction, he purchased the mining and manufacturing properties which were subsequently sold to the Tennessee Company. Col. Ensley then served as TCI's first president in Alabama.

more solidly entrenched iron firms in the North and Middle West. They began construction, in Opossum Valley near Village Creek, of four blast furnaces, each capable of producing 200 tons of iron a day, added 1,400 coke ovens and opened four new coal mines.

At the same time, Ensley conceived the idea of entering the real estate business. Reasoning that there was likely to be a large influx of merchants to the new industrial center, he felt that real estate development around the Ensley plants could be made an extremely profitable venture. He therefore organized the Ensley Land Company and had 4,000 acres of TCI land transferred to the new concern.

Before that project was well under way, however, Col. Ensley was hurriedly called to England, where his wife had become seriously ill. While he was abroad, TCI suffered another of its continually recurring misfortunes, this one in the form of a dangerous drop in the price of pig iron. With the future of the iron company in such grave doubt, prospects for a real estate boom in the area vanished, for the time, and plans for what Ensley had hoped would be the "great industrial city of the nation" were considerably altered.

Ensley had already expended a considerable sum of borrowed money on development, and now, with nobody interested in buying his lots, he was not in a position to meet the demands of his creditors. Eventually, the entire Ensley project was sold for $15,000, to pay a legal judgment rendered in favor of the creditors.

Prior to this time, pig iron produced in TCI blast furnaces was sold to other plants that remelted it to make iron castings, or converted it into wrought iron in puddling furnaces. TCI's new difficulties were brought about chiefly because steel was fast supplanting wrought iron in many commercial and industrial applications where greater strength was required. This

Among the properties acquired by TCI in its move to Alabama was historic Linn Iron Works, one of the earliest metalworking plants in the Birmingham district.

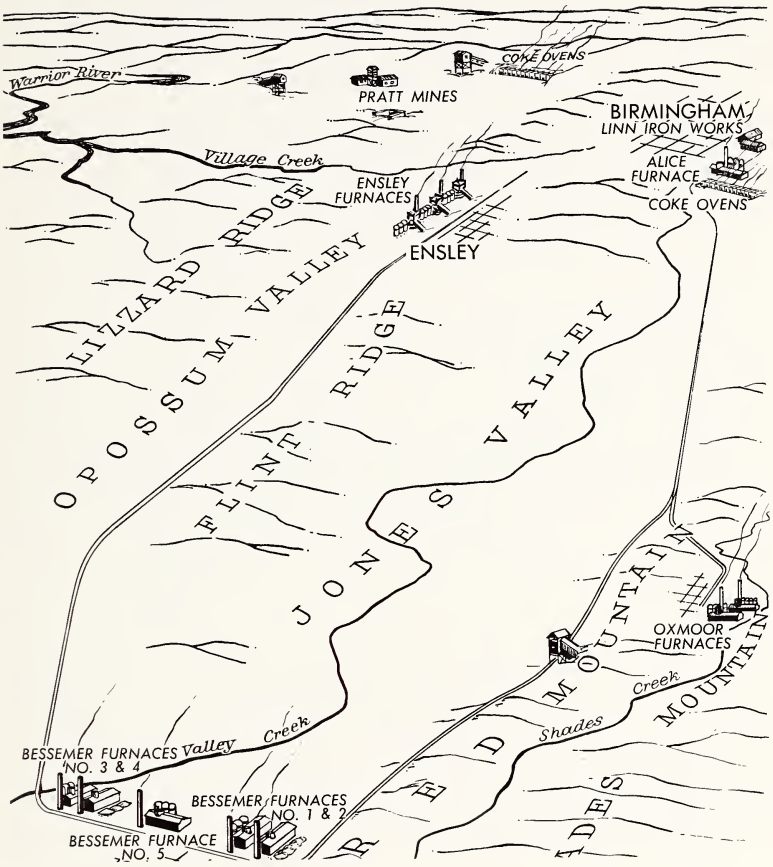
was particularly true in the railroad business, where heavier and faster trains made necessary the development of rails which could withstand greater punishment without breaking. Wrought iron rail manufacture during that period absorbed a large volume of the nation's pig iron production—especially that of TCI. As the demand shifted to steel rails, those concerns which produced pig iron suffered. It was evident that if TCI was to survive, it must alter its operating policy to keep in step with industrial progress.

In 1892, additional mining and production facilities to the company's already extensive holdings were brought about through the purchase of the DeBardeleben Coal and Iron Company and the Cahaba Coal Mining Company, which was, itself, owner of the Excelsior Coal Company. At the same time, recommendation was made that TCI enter the manufacture of steel.

The decision to produce steel was not a matter to be taken lightly. It involved a great deal more than finding the required capital and installing the necessary manufacturing facilities. At that time, there was considerable doubt that steel of passable quality could ever be made from locally produced iron. Red Mountain ore was extremely low in iron content and contained a high percentage of non-metallic acids. In addition, the refining processes then in common use were not adequate to produce iron that could be refined into steel of the desired quality.

However, Alfred Montgomery Shook, during one of the periods when he was separated from TCI because of changes in top control, had set out upon a venture of his own. This venture was to have a vital effect upon the development of the iron and steel industry of the Birmingham district. He journeyed to England and brought back with him a promising young British engineer by the name of Benjamin Talbot. He put

BIRMINGHAM AREA 1899



The year 1899 was a historic one for both TCI and the Birmingham district. Having moved to Alabama from Tennessee some 13 years before, TCI had put together a complex of mining, coking and iron manufacturing facilities and had built the district's first commercial steel plant. First steel flowed from TCI's furnaces just weeks before the turn of the century.

Talbot to work devising a means whereby basic iron could be made profitably from Southern ores, and good basic steel could be produced in commercial quantities from the new type of iron. The result of Talbot's experiments was a series of inventions that made him world famous in the iron and steel industry.

His first basic iron was made at South Pittsburg, Tenn. On the basis of the development of Talbot's continuous process for making basic iron, Shook organized a company in Chattanooga, and erected several open hearth furnaces for the production of basic steel. Here it was demonstrated that commercial production was feasible.

In Birmingham, the manufacture of basic steel from Alabama ore was undertaken at the Henderson Iron and Manufacturing Company. In 1888, a small cast was made, purely on an experimental basis. To prove its suitability for commercial use, the steel was sent to an Atlanta razor manufacturer, who made from it a gross of razors and a carving knife and fork.

The event attracted favorable press comment all over the nation, and Atlanta newspapers heralded it as the beginning of a new industrial era in the South.

The Alice Furnace had been the site of TCI's first successful production of basic iron in Alabama. It was shown that basic iron could be made at the blast furnace without involved processes for the removal of impurities. In 1895, TCI accepted an order from a Northern steel concern for basic iron, and began quantity production of the metal. The customer companies converted the Southern product to basic steel, using it for production in the same ratio in which they used their own iron. This fact, coupled with the successful experiment at Henderson, convinced TCI management that mass production of steel in Alabama was practical.

This was Birmingham when TCI moved in from the Cumberland Mountains of eastern Tennessee.

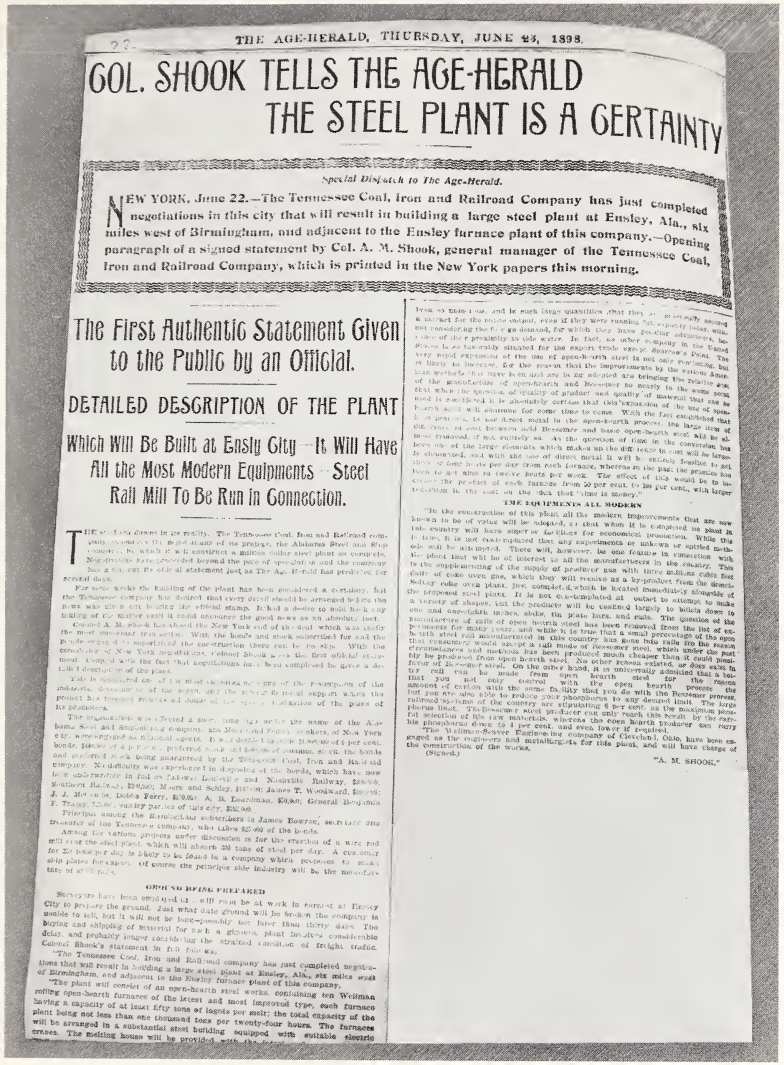
Thus, in 1898, the company took the necessary steps to enter this new field of endeavor. A new corporation, subsidiary to TCI, had already been chartered for the purpose of erecting and operating a steel plant. This was the Alabama Steel and Shipbuilding Company. Then the actual work began on the planned expansion program which included an open hearth plant at Ensley, capable of producing 1,000 tons of steel per day.

Original plans called for 10 open hearth furnaces, each of 50 tons capacity per heat, a blooming mill, billet mill and rail mill.

The plant was ready for operation in the autumn of 1899, and the first heat of steel was actually tapped on Thanksgiving Day. On the opening day of the Twentieth Century, TCI made its first commercial shipment of steel. To a customer in Connecticut went 24 tons of slabs from the new open hearth plant.

In reviewing the historic occasion later, a man who had been intimately connected with the company at the time said, "The Tennessee Company (had) now demonstrated that basic open hearth steel could be successfully and commercially manufactured in the Birmingham district and that basic open hearth rails could be successfully and commercially manufactured and sold in competition with Bessemer rails. This had never before been done successfully in the United States . . . A quarter of a century of the reign of Bessemer steel developed the fact that the country required and demanded a better quality of steel than could be made in the Bessemer process. The iron and steel makers of this country were slowly and reluctantly forced to admit this fact. Then, and not until then, did the Birmingham district enter the field as a real competitor."

Also in 1899, TCI made two significant purchases. First it



THE AGE-HERALD, THURSDAY, JUNE 23, 1898.

COL. SHOOK TELLS THE AGE-HERALD THE STEEL PLANT IS A CERTAINTY

Special Dispatch to The Age-Herald.

NEW YORK, June 22.—The Tennessee Coal, Iron and Railroad Company has just completed negotiations in this city that will result in building a large steel plant at Ensley, Ala., six miles west of Birmingham, and adjacent to the Ensley furnace plant of this company.—Opening paragraph of a signed statement by Col. A. M. Shook, general manager of the Tennessee Coal, Iron and Railroad Company, which is printed in the New York papers this morning.

The First Authentic Statement Given to the Public by an Official.

DETAILED DESCRIPTION OF THE PLANT

Which Will Be Built at Ensly City—It Will Have All the Most Modern Equipments—Steel Rail Mill To Be Run in Connection.

THE steel plant deal is an reality. The Tennessee Coal, Iron and Railroad company, president of the proposed plant of the Alabama Steel and Ship company, by which it will construct a million dollar steel plant as complete. Negotiations have proceeded beyond the pale of speculation and the company has a ten, not to call it statement just as The Age-Herald has predicted for several days.

For some weeks the building of the plant has been considered a certainty, but the Tennessee company has desired that every point should be arranged before the news was given out bearing the official stamp. It had a desire to hold back as long building of the railway until it could announce the good news as an absolute fact.

Colonel A. M. Shook has closed the New York end of the deal which was pretty the most important from action. With the bonds and stock subscribed for and the people engaged in superintend the construction there can be no slip. With the consultation of New York negotiations, Colonel Shook gave the first official information. Coupled with the fact that negotiations have been completed he gave a detailed description of the plant.

This is considered one of the most gratifying pieces of the prosperity of the industrial. Birmingham of the south, and the active official support which the project has received from the railroad officials of the state, indication of the plans of its promoters.

The organization was effected a short time ago under the name of the Alabama Steel and Shipbuilding company, and Moore and Schley brokers of New York city, were appointed financial agents. It was decided to issue $1,000,000 of 5 per cent. bonds, $500,000 of 6 per cent. preferred stock and $500,000 of common stock. The bonds and preferred stock being guaranteed by the Tennessee Coal, Iron and Railroad company. No difficulty was experienced in disposing of the bonds, which have been underwritten in full as follows: Louisville and Nashville Railway, $200,000; Southern Railway, $200,000; Moore and Schley, $100,000; James T. Woodward, $50,000; J. J. Morgan, Dobbs Ferry, $50,000; A. B. Boardman, $50,000; General Benjamin F. Tracy, $25,000; sundry parties of this city, $50,000.

Principal among the Birmingham subscribers is James Bowron, secretary and treasurer of the Tennessee company, who takes $25,000 of the bonds.

Among the various projects under discussion is for the erection of a wire rod mill near the steel plant, which will absorb 200 tons of steel per day. A contract for 25 tons per day is likely to be found in a company which proposes to manufacture of wire fence.

GROUND BEING PREPARED

Surveyors have been employed and will soon be at work in force at Ensley City to prepare the ground. Just what date ground will be broken the company is unable to tell, but it will not be long—probably not later than thirty days. The buying and shipping of material for such a gigantic plant involves considerable delay, and probably longer considering the strained condition of freight traffic. Colonel Shook's statement in full follows:

"The Tennessee Coal, Iron and Railroad company has just completed negotiations that will result in building a large steel plant at Ensley, Ala., six miles west of Birmingham, and adjacent to the Ensley furnace plant of this company.

"The plant will consist of an open-hearth steel works, containing ten Wellman rolling open-hearth furnaces of the latest and most improved type, each furnace having a capacity of at least fifty tons of ingots per melt; the total capacity of the plant being not less than one thousand tons per twenty-four hours. The furnaces will be arranged in a substantial steel building equipped with suitable electric cranes. The melting house will be provided with the [illegible] iron as steam [illegible], and in such large quantities that they [illegible] a market for the entire output, even if they were running [illegible] not considering the future demand, for which they have [illegible] reason of their proximity to ode water. In fact, no other company in the United States is so favorably situated for the export trade except Sparrow's Point. The very rapid expansion of the use of open-hearth steel is not only continuing, but is likely to increase. For the reason that the improvements by the various American works that have been and are to be adopted are bringing the relative cost of the manufacture of open-hearth and Bessemer so nearly to the same point that when the question of quality of product and quality of material that can be used is considered it is absolutely certain that this separation of the use of open-hearth steel will continue for some time to come. With the fact established that [illegible] open-hearth metal is for almost all the manufacturers in the country. The [illegible] of coke ovens, which they will receive as a by-product from the Semet-Solvay coke oven plant, now completed, which is located immediately alongside of the proposed steel plant. It is not over-complicated at present to attempt to make a variety of shapes, but the products will be confined largely to billets down to one and one-eighth inches, slabs, tin plate bars, and rails. The question of the manufacture of rails of open hearth steel has been removed from the list of experiments for many years, and while it is true that a small percentage of the open hearth steel rail manufactured in this country has gone into rails for the reason that consumers would accept a rail made of Bessemer steel, which under the particular circumstances and methods has been produced much cheaper than it could possibly be produced from open hearth steel. No other reason existed, or does exist in favor of Bessemer steel. On the other hand, it is universally admitted that a better rail can be made from open hearth steel for the reason that you not only control with the open hearth process the amount of carbon with the same facility that you do with the Bessemer process, but you are also able to reduce your phosphorus to any desired limit. The large railroad systems of the country are stipulating 6 per cent. as the maximum phosphorus limit. The Bessemer steel producer can only reach this result by the careful selection of his raw materials, whereas the open hearth producer can carry his phosphorus down to 4 per cent, and even lower if required.

"The Wellman-Seaver Engineering company of Cleveland, Ohio, have been engaged as the engineers and metallurgists for this plant, and will have charge of the construction of the works.

(Signed.)

"A. M. SHOOK."

It was big news in Birmingham when TCI announced it would install facilities to convert its pig iron to steel. In the intervening 60 years, this district has become one of the major steel centers of the world.

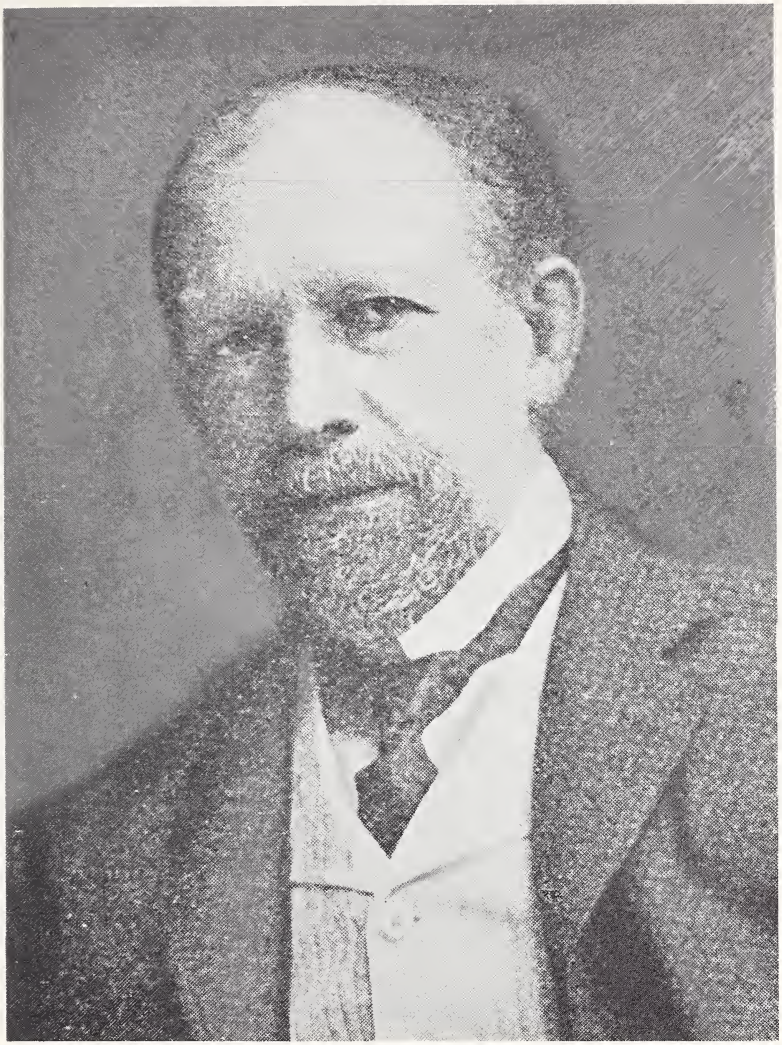
bought the Sheffield Coal, Iron and Steel Company, at Sheffield, and almost immediately thereafter it acquired the property of the Bessemer Rolling Mill Company.

Acquisition of the Bessemer Rolling Mill Company was another step forward in the logical sequence of expansion from mining concern to manufacturer of finished products. This plant, located near two of TCI's Bessemer, Ala., blast furnaces had mills capable of rolling both wrought iron and steel into finished or semi-finished shapes. Its proximity to the company's furnaces made possible low transportation costs in intra-company shipments, and thus helped to establish a favorable competitive position in the production and sale of iron and steel products.

Another of the frequently recurring changes in top management came in 1902, when Don H. Bacon succeeded Nathaniel Baxter as president. Bacon, as had most of his predecessors, found the company's treasury practically empty. Furthermore, in the pell-mell race to expand the scope of the company's operations, existing facilities had been allowed to deteriorate. By this time, too, financial speculators in Wall Street had discovered the Tennessee Company, and their maneuvers and negotiations to gain control of this prize financial plum were making sound management of the company extremely difficult.

Nevertheless, Bacon set himself to the task of rehabilitation. The railroad properties were consolidated. New dolomite quarries were opened, and more modern facilities were installed at ore mines and coal mines. New methods of mining were introduced. The use of coke oven gas as a boiler fuel was begun, and electricity began to supplant steam power in the operation of the mills. Plans were laid for building an additional blast furnace at Ensley and rebuilding the existing ones.

At the same time efforts were extended to revamp and revitalize production facilities, a policy of more comprehensive



Don H. Bacon was president of TCI in 1902, when the company revolutionized the rail-making industry by proving that rails of open hearth steel could be made and sold at prices competitive with rails of Bessemer steel.

health service to employees was invoked. Under Bacon's direction, an employee medical service was established, and small hospitals were erected in plant areas.

But the most significant advance toward a well rounded manufacturing operation was the completion of the rail mill at Ensley. By 1902 the mill was producing rails of excellent quality. For many years, steel rails formed a dominant portion of TCI's finished steel output.

Bacon remained at the helm for five years. However, in 1906, shifting ownership again brought about a change in top management, and Bacon was succeeded by John A. Topping, who became chairman of the executive committee.

Topping's succession to the leadership deserves special attention because of one outstanding fact. Up to this point, top men in the company had usually gained their positions because of the financial support they could bring with them or as a result of brilliant business maneuvering rather than because of their understanding of the processes of steel manufacture. Officers had been cotton brokers, lawyers, statesmen, bankers—practically everything but steel men. They had been promoters first and producers second. Bacon had been an exception in that he was an expert on mining, but he, too, knew little about steel making. Topping was well versed on the manufacture of iron and steel. He was just what the company needed at that point.

Topping believed that the secret of successful operation lay in obtaining more and better skilled workmen, and he believed that in order to obtain good workmen, it was necessary to offer them attractive working conditions and wholesome living quarters. His efforts in this direction set a precedent in the South for good industrial relations.

During his administration, plans set by his predecessor for renovating Ensley Works were not only carried forward but

A major turning point in the history of TCI came on the first day of the Twentieth Century, when this load of steel slabs was shipped from its new mills at Ensley. The steel was consigned to a manufacturer in Bridgeport, Conn.

were greatly extended. The Birmingham Southern Railroad Company, which operated in the industrial section of the district and primarily served for intra-plant transportation at TCI, was bought by the company. Its trackage was expanded and its rolling stock augmented. New ore mines and an additional dolomite quarry were opened. Washers were installed at coal mines to prepare a better product for use in the coke ovens. Two Bessemer converters and four additional open hearth furnaces were planned, with the avowed intention of doubling the steel capacity. A new rail mill was also planned.

Enter United States Steel

1907

FINANCIAL REVERSES, though, were by no means a thing of the past. In 1907 a financial panic struck the nation. Numerous banks and trust companies failed throughout the United States. Credit was virtually suspended.

Tennessee Coal, Iron and Railroad Company was deeply in debt and the syndicate that controlled TCI was not prepared to advance the sum of money which, according to estimates, would be required to put the company on a sound financial and competitive basis. This adverse condition of the company aggravated by the panic caused a severe depreciation in the value of the company's stock. As a consequence of this, one of the chief brokerage houses of New York which held large quantities of the stock as collateral was in dire financial straits. If the brokerage house should fail, it was feared that this would greatly intensify the panic and cause a chain reaction of many other business failures. With the purpose of warding off such a disaster, representations were made to the Chairman of United States Steel that the Corporation buy the properties of Tennessee Coal, Iron and Railroad Company which would restore the value of the company's stock.

United States Steel rejected the proposal. As the financial panic tightened its grip on the nation and the salutary effects of the purchase were insistently pressed upon them, the Corporation management finally yielded but only on condition that the entire matter be put before President Theodore Roosevelt. This was done in an overnight visit to Washington by United States Steel representatives. The President voiced approval of the project, a position later sustained by the

United States Supreme Court. The purchase was completed on November 1, 1907.

Thus TCI, after more than a half century of skirting the edges of bankruptcy, entered an era of sound financial condition. The wild surges between boom and bust were now at an end, and the company began a period of steady if somewhat less spectacular progress.

The transaction completed, United States Steel installed as president a dynamic, progressive businessman by the name of George Gordon Crawford. Crawford was to remain at the helm of the company for 23 years, a period many times that of any of his predecessors. During his administration, the company became solidly fixed as a vital economic factor in the South. It pioneered many fields in the industrialization of the region, and came to be recognized as one of the most important constructive influences upon the general prosperity of Alabama and its neighboring states. From 1907 until the end of Crawford's tenure almost every year saw some major expansion or modernization projects begun or completed.

In 1907, a new limestone quarry was opened. In 1908, a new coal mine, at Docena, was placed in operation. In 1910, work was begun on the Edgewater Coal Mine. In 1911, effective steps were taken to remedy one of the greatest drawbacks with which industry in the Birmingham district was faced. This was the lack of an adequate supply of industrial water.

Steel making requires the use of water on a scale equalled in very few other industrial operations. This, more than any other single physical factor, stood in the way of further growth. To provide the necessary water for current and future operations, the company undertook what was at the time an impounding project of considerable magnitude. A reservoir was created on Village Creek, near the shaft of the Edgewater Coal Mine, by the construction of a masonry dam, which is

George Gordon Crawford, installed as president of TCI when it became a part of United States Steel, brought modern concepts of industrial management to the company. Under his leadership, many old facilities were replaced or modernized, many new and more efficient manufacturing processes were installed, and a far-reaching health program, which converted the disease-ridden industrial area into a wholesome and healthful plant community, was initiated.

known as Bayview Dam. The original dam, with subsequent enlargements, is 407 feet long and 106 feet high. The lake thus created covers an area of 530 acres and has a capacity of more than three and a half billion gallons. Its water is collected from a watershed roughly 75 square miles in area.

To deliver the water from the reservoir to a pumping station, an intake tunnel was cut through approximately a mile and a half of rock. The tunnel, concrete lined, is five and a half feet wide and more than six feet high.

The water works system was completed in August, 1911.

Up to this period, the common method of converting coal to coke was by heating it in hemispherical structures of fire brick or of stone, called beehive ovens because of their shape. Some of the coal in the oven was allowed to burn to supply the necessary heat. The burning was controlled in a crude way by trying to regulate the amount of air permitted to enter the oven through an opening left in the door. Accurate control over the rate of combustion was, of course, hardly possible. Furthermore, many valuable by-products of coal went up in the smoke which escaped from the ovens, there being no practical way to collect and distill these fumes.

By 1912, however, a by-product coke plant consisting of 280 ovens was completed. This made possible the economical production of consistently high quality coke and permitted TCI, for the first time, to recover and process the coal chemicals that previously had been lost in smoke. Thus, material which had been dissipated in the atmosphere was now available for the manufacture of hundreds of modern chemical products, including such items as motor fuel, heating gas, fertilizer, moth balls, paving materials and ingredients for paint and explosives.

That year was an extremely significant one for TCI and for the communities that surrounded its plants. Now that the

progressive and soundly managed United States Steel Corporation was firmly settled in the Birmingham district, advances came in rapid succession.

To convert a part of TCI's steel production to consumer products, United States Steel built a wire plant a short distance from the Ensley Works, in the center of TCI's property. This plant, a division of American Steel and Wire Company, was equipped to produce wire of various gauges, barbed wire, woven wire fence, nails, staples and rods. It was later transferred to TCI from American Steel and Wire, and is now known as TCI's Fairfield Wire Works.

A central electric power plant was installed at Ensley. Utilizing gas recovered as a by-product of the company's manufacturing operations, this plant provided much of the power needed to drive the rolling mills. Conversion to electricity from steam power greatly stepped up the efficiency of production.

Edgewater Coal Mine was placed in production.

To the men who worked in the plants, however, probably the most important event was the founding of a city specifically to provide homes for TCI employees and their families. This not only had a direct impact upon the Birmingham industrial area, but helped to introduce a new concept of the relationship between management and its employees.

One of the greatest problems still facing the officials of TCI was securing and maintaining an adequate labor force. Living conditions in the plant vicinity up to that time had been such that good steel workers and miners were reluctant to bring their families into the area. Having accepted jobs with the company and experienced the unattractive and unhealthful conditions of surrounding communities, men would leave after only a short period.

In order to reduce expensive labor turnover, and to main-

tain a force of first-class employees, it was decided to construct near the manufacturing center a community with wholesome and pleasant surroundings. Plant communities were, of course, nothing new. Because its operations were in undeveloped territory, TCI had been forced to build several such towns at its various mining centers. However, this was to be something different in the way of employee housing. Accepted practice was for a company to build on its property, as inexpensively as possible, a few homes, a commissary and perhaps a school and churches. The houses would be rented to employees. All of the property, however, would remain that of the employer. The workman was thus closely tied to his employer, not only in his workaday life, but in his private life, as well. He sent his children to school in a company building, where they were instructed by teachers selected quite frequently by company officials. His recreation was often provided through company-owned facilities, with company supervision. He even worshiped at places provided by his employer.

This practice had its good points. In that day, the homes provided were better than the workman could provide for himself. Company school buildings were better built and better equipped than many provided by governmental agencies. Recreation was usually supervised by qualified instructors on the pay roll of the employer.

But such a system offered the possibility of abuse and incurred the resentment – sometimes deservedly and sometimes not—of the employees. It took away much of their individuality and left them less freedom of choice in their private lives than that enjoyed by their neighbors whose employers took less personal interest in them.

So, in building the new city, United States Steel decided to follow a new course. It would provide the land upon which the community would be built, and would encourage the construc-

The Fairfield Steel Works was built during World War I, primarily to provide steel for shipbuilding. In addition to the cornfield shown here, the small community of Snow Spring gave way to progress when the plant was built.

tion of substantial homes at moderate prices, but otherwise would stay completely in the background. A group of Birmingham businessmen was persuaded to undertake the development of the city. For a nominal sum, the corporation conveyed to this group a large acreage in Opossum Valley, retaining only such control as was provided in the agreement that an attractive community would be provided, with homes being built which would be in the price range that TCI employees could afford.

The city was laid out very carefully, only after extensive study of industrial communities all over the world. A professional landscape architect was employed for this job. He incorporated in his plans the best features of both American and European industrial towns. This community, named Corey, after a member of U. S. Steel's board of directors, came to be known as the "model industrial city." It has been visited and studied by representatives of both industrial and governmental organizations, with a view toward instituting similar projects on several continents.

While the city was under construction, Theodore Roosevelt visited the site and made an address in the Plaza, which marks the center of the business district.

Later, the name was changed from Corey to Fairfield.

The birth of Fairfield was only a beginning in TCI's enlightened efforts on behalf of its employees. Almost simultaneously was undertaken a vast and expensive project to raise the standards of sanitation and health throughout the area from which the company drew its working force. This was an improvement which had been sorely needed for a long time. Vast swamplands, the breeding places for mosquitoes and other disease-bearing insects, occupied much of the space in the western section of Jefferson County, in which was centered much of the district's heavy industry. Lack of sanitary facil-

ities and polluted water supplies were responsible for continually recurring epidemics which decimated labor forces and threatened to cancel out all the advantages accruing from the ready access to rich mineral deposits. By 1913, the labor turnover at TCI had reached 400 per cent per year, and the average working time per employee was 12 days of each month. The high rates of separation and absenteeism were traceable directly to the prevalence of serious illness among employees and their families.

To remedy this situation, George Gordon Crawford procured the services of Dr. Lloyd Noland, a young physician and surgeon on the staff of General William Crawford Gorgas, in the Canal Zone. Coming to Birmingham in 1913, as supervisor of TCI's newly-created Health Department, Dr. Noland found that many of the same conditions existed here that had for so long prevented the construction of the Panama Canal. Dr. Noland immediately built his organization into an effective disease-fighting unit which included hospital and dispensary service for employees, a sanitary division to drain and treat swamps, seal off polluted water supplies and construct proper sanitary facilities and a health counselling service. During the first year of its operation, TCI's Health Department expended three-quarters of a million dollars, as compared to a mere $25,000 budgeted for the Health Department for the State of Alabama during the same year.

An indication of the results obtained was the rapid decline in the incidence of malaria, probably the most widespread malady in the area. Occurrences of the mosquito-spread disease dropped by more than 90 per cent during the first year. Four years later, the number of cases reported amounted to one half of one per cent of the number listed for 1913. Thus TCI came to be recognized as a pioneer in the field of industrial health and medicine.

The capstone of the TCI health and medical program was the construction of the TCI Employees Hospital. Conceived by Dr. Noland, whose enthusiasm and persistence sold the idea to the management of United States Steel, the hospital was built in a heavily wooded area atop Flint Ridge. The original building and facilities cost more than one and one-quarter million dollars, a truly tremendous sum of money at that time. Nevertheless, the corporation got its money's worth, because it was one of the finest hospitals in Alabama. The first patient was admitted in November, 1919.

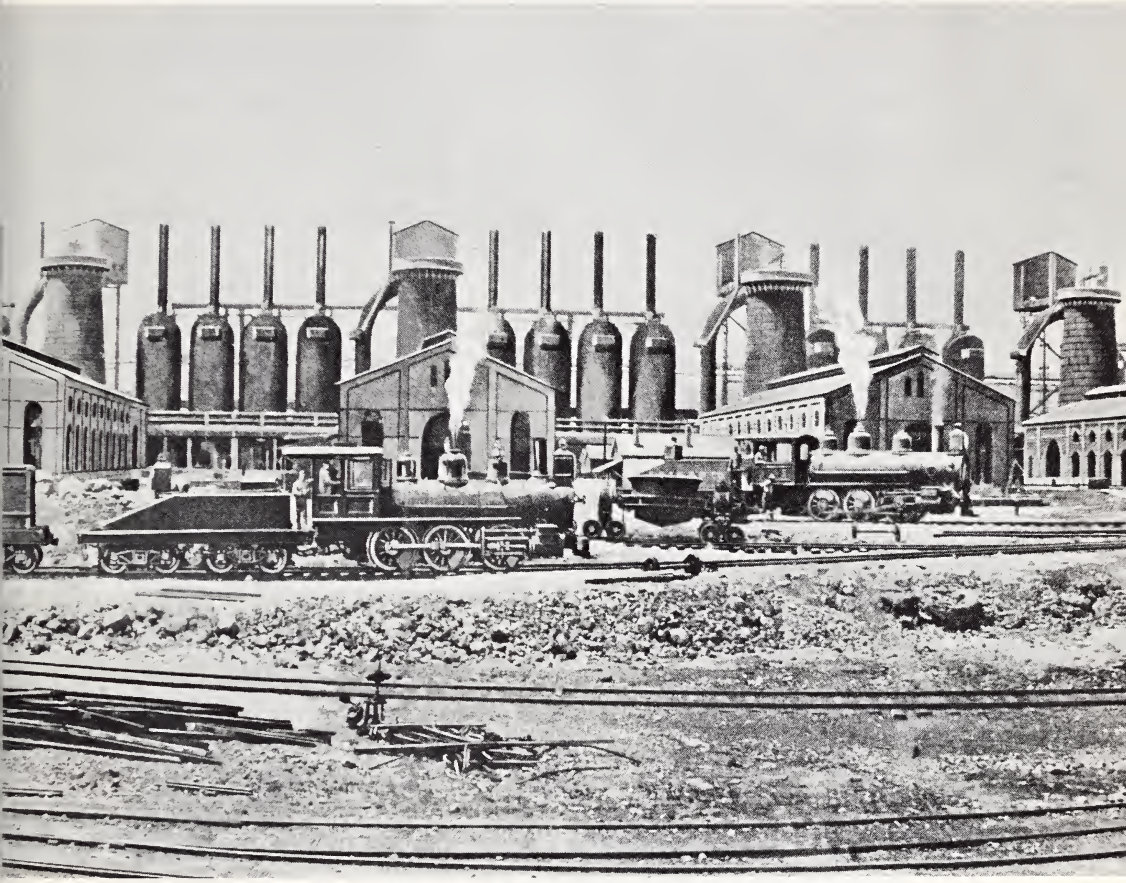
In 1950, shortly after Dr. Noland's death, the hospital was rededicated and renamed the Lloyd Noland Hospital, in his honor. In 1951, TCI gave the hospital, still one of the finest in the Birmingham district, to the people of western Jefferson County. A foundation completely independent of TCI was established, and a self-perpetuating board composed of prominent business and professional men was appointed to administer the affairs of the hospital for the people it was to serve.

At the same time, TCI gave the foundation three-quarters of a million dollars for construction of a modern outpatient clinic adjoining the hospital. With completion of the clinic, the board went forward with other extensive additions and improvements.

By contract with TCI, the hospital continues to serve the division's employees; but now its facilities are available to all who need them.

At all steel manufacturing plants, certain valuable and commercially important by-products are recovered during the steel making process. TCI, however, is the only steel operation in America which sells basic open hearth slag soil conditioner.

It was in 1914 that the company installed at its Ensley Works a plant for pulverizing and bagging the mineral-rich



Blast furnaces were still relatively small, simple structures when these were built at the Ensley steel plant.

slag for agricultural use. The production of this material was made possible by the very factors which had made the development of the Alabama steel industry so difficult – the occurrence in Red Mountain iron ore of high percentages of certain chemical impurities. The particular type of basic steel manufacture found in America only at Ensley produces a type of slag suitable for making the soil conditioner. The slag contains not only a large amount of calcium, derived from the limestone flux, but other elements, such as iron oxide, silicon, phosphorus and manganese, all of which are beneficial to farm and pasture lands.

Basic slag had been used as a soil conditioner in Great Britain for a great many years, and was in such demand that British steel plants were not able to produce an adequate supply. Upon discovering that TCI ores and manufacturing practice yielded slag of similar chemical content, certain businessmen from that nation approached officials at Birmingham with the proposition that TCI manufacture the soil conditioner for sale in England and Scotland. The management was impressed by the idea, but concluded that a ready market could be found for the product in the agricultural region surrounding the plant. Processing facilities were installed adjacent to the open hearth building, and a sales organization was set up to merchandise the soil conditioner.

Experiments conducted by agricultural services in several Southern states have shown that the slag has a highly beneficial effect on plant growth. TCI has never suffered from a lack of demand for the product.

TCI Spreads Its Wings
1917

IN 1917, THE UNITED STATES was drawn into World War I, the conflict in which was born the concept of modern mechanical warfare. The nation's production facilities were taxed to the limit, to provide the vehicles and armament required for this new type of fighting. Steel and products of steel were in far greater demand than ever before.

As a contribution to the war effort, TCI embarked upon another large expansion program, which included the construction of a new steel works to supplement the facilities at Ensley. This new plant, the Fairfield Steel Works, was begun primarily as a rolling mill to convert ingots cast at Ensley into the necessary shapes for fabricating merchant ships. First facilities to be installed were a plate mill, blooming mill, and a bar and structural mill.

At the same time, plans were advanced for the erection of a shipyard, near Mobile, where the products of the Fairfield plant were to be used in building ships. To enter the shipbuilding business, TCI formed three subsidiary companies, the Chickasaw Land Company, the Chickasaw Utilities Company and the Chickasaw Shipbuilding Company. The shipbuilding company produced some 14 ships before the return of peace rendered these facilities unnecessary.

The Rail Transportation Department was organized in 1918, being built around tracks and facilities serving coal mines and plant operations. These were acquired from the Birmingham Southern Railroad Company, a TCI subsidiary. Some years later Birmingham Southern was separated from TCI, becoming a common carrier. However, TCI continued to maintain an inter-plant transportation system.

With the closing of the shipyard in 1921, there arose the problem of how to utilize the rolling facilities installed only three years before. It was decided to make use of the Fairfield plant's production by undertaking the manufacture and repair of railroad freight cars. The Fairfield Car Works was constructed, this plant having a capacity for building 6,000 steel cars and for rebuilding and repairing 4,500 cars per year. Subsequently the plant equipment was sold to the Pullman Car Manufacturing Company, and became the basis for that company's large plant at Bessemer, Ala.

In 1921, Hamilton Coal Mine was placed in operation.

Progress in industry, however, is not limited to the installation of new plants and increases in production. Among the chief contributory factors to the industrial growth of America is the continual development of more efficient production equipment. Through the invention and application of mechanical and electronic production facilities, it has become possible to produce in ever greater volume, with increasingly lower unit cost of production. One of the mileposts in modernization of production technique at TCI was the installation, in 1923, of mechanical loading equipment in seven of the red ore mines. This marked the beginning of the decline of the old pick and shovel method of mining, and has been followed by many other mechanical developments which have practically converted underground mining to a production line operation.

Also that year saw the addition of an 11-inch merchant mill at the Fairfield Steel Works, which effected still further diversification of the company's saleable products. The term "merchant mill" is used, because the products of that operation were originally designed for direct sale to jobbers or merchants rather than to other manufacturers for conversion to finished products. Products of the mill are bars of various

Over the years, ore mining at TCI has advanced from crude pick-and-shovel digging into the outcrop to the use of complex and efficient power equipment. This mechanical loader gathers loose ore from the floor and delivers it back to electrically powered shuttle cars.

gauges and lengths, which are rolled to round, square or flat cross-section. Principal use of the products is for concrete reinforcement. However, the bars also serve many other uses, such as in the fabrication of parts for machinery, burglar bars, ornamental steel work and the like.

Transportation costs have an important bearing on the ability of a manufacturer to produce goods which can be marketed at a competitive price. This is true not only as regards the shipment of finished products to consumers, but just as vitally in the matter of assembling raw materials and moving semi-finished materials from one point of processing to the next within plant areas. Manufacturers in the Birmingham district have a certain advantage in this respect, in that all of the prime ingredients necessary for the making of iron and steel may be taken from the ground within half a day's hiking distance from the plant areas. In many of America's steel producing sections, one or more of the necessary raw materials must be hauled for hundreds of miles overland and by water.

Even though iron ore, coal, limestone and dolomite lie close at hand, these materials must nevertheless be assembled in such large tonnages that transportation is a major factor in the operation of a steel plant. In its early days, TCI leaned heavily on common carriers for the movement of its minerals from mines to plants. As the company grew, this was found to be neither an adequate nor an economically sound solution for its transportation problems. So, in 1925, TCI undertook the extremely ambitious project of a special railroad which would connect its ore mines on Red Mountain directly with the steel plants at Ensley and Fairfield. At the time of its building, this railroad was considered one of the world's greatest feats of railway engineering. Extending five miles across Jones and Opossum Valleys, the roadbed ignores terrain

features, rising 15 to 20 feet above the valley floors and running through Flint Ridge in a cut 53 feet deep. This not only makes for a gentle, even grade between Red Mountain and Opossum Valley, but enables the railroad to pass above many highways and other railroads. There are no grade crossings throughout the entire length of the line. To accomplish this masterpiece of engineering, it was necessary to move one and a third million cubic yards of dirt, in filling and grading. For bridges and approaches, 21,000 cubic yards of concrete masonry and 1,900 tons of fabricated steel were used.

Still combatting the district's ever-present shortage of industrial water, the company also in 1925 increased the height of its Bayview Dam by 15 feet. This considerably raised the storage capacity of the reservoir.

Manufacturing facilities, too, were being expanded, and by the end of that year a four-furnace open hearth plant had been added at the Fairfield Steel Works.

Also added at Fairfield was a rail fastening department. This made it possible for TCI to offer its rail customers a line of accessories such as tie plates, splice bars, spikes and track bolts which they had previously been forced to buy elsewhere.

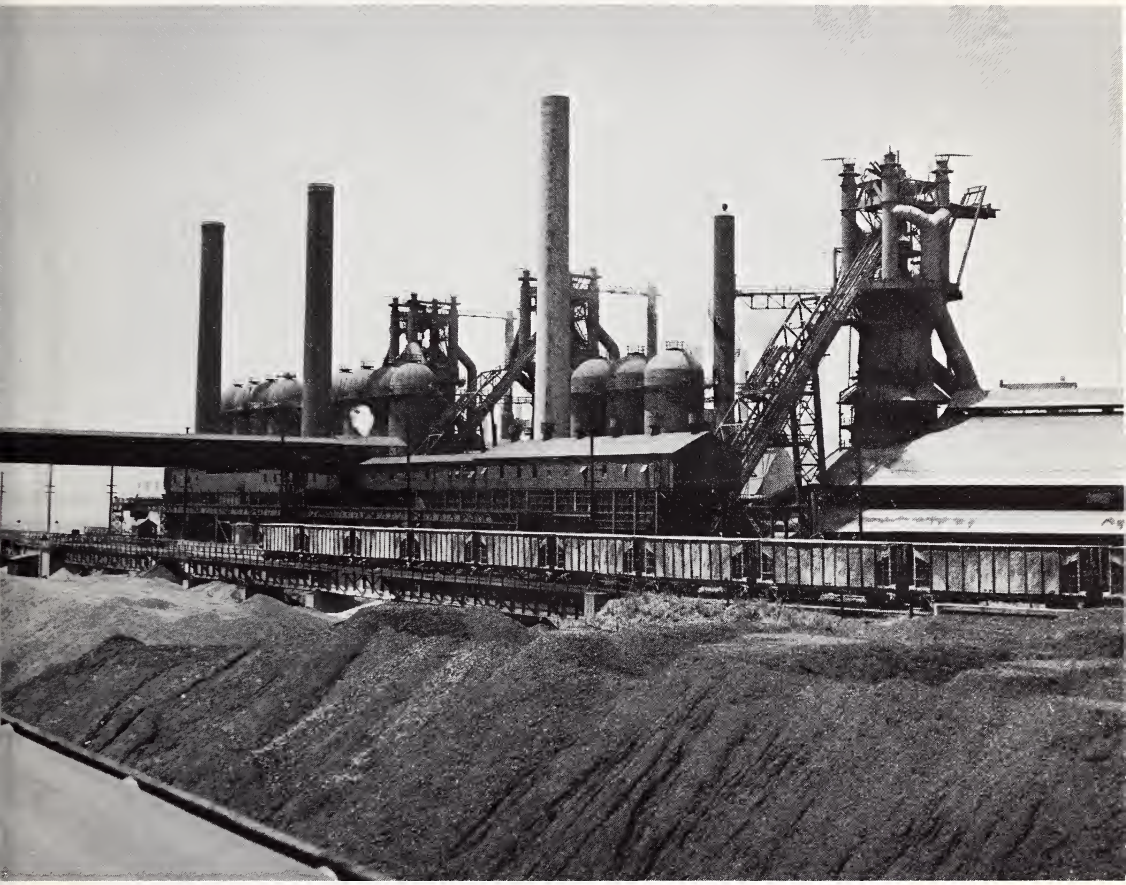
The following year, 1926, was one of significant beginnings and completions. The Fairfield Sheet Mill, which today is a major source of supply for manufacturers and fabricators throughout the South, was finished. It is interesting to note that methods of production and quality of sheet steel were advancing so rapidly during that period that, no sooner had the mill been completed than the company began pulling out practically new equipment and installing machinery of a newer and better design. That same thing has happened at the sheet mill repeatedly in the little more than a quarter of a century that it has been in operation.

In that year also came the completion of a 21-inch continuous sheet bar and billet mill and four additional open hearth furnaces, at the Fairfield Steel Works, to supply the necessary steel for rolling into sheets at the sheet mill.

While the internal transportation network was being enlarged and improved, careful thought was being given to the necessity for rapid and economical shipment from mills to customers. Since it was recognized that many of TCI's customers could be reached more efficiently by means of coastwise water transport than by overland haulage, the company organized its Water Transportation Department in 1926. Facilities were provided to ship large tonnages of products down the Warrior and Tombigbee Rivers from Birmingport to the Port of Mobile and thence along the Gulf Coast to Mississippi, Louisiana and Texas ports. These facilities included two diesel-electric towboats and a fleet of barges, suitable for both river and coastwise navigation. Thus TCI was enabled to transport its products from its inland plants to various ports along the Gulf Coast, almost entirely by water. In 1941, this department was sold by TCI. However, it continues to serve the division.

As the Southern market developed, new demands for steel made it wise for TCI not only to increase its volume of output, but again to widen the variety of steel products which it could offer for sale to manufacturers and jobbers. Consequently, the young Fairfield Steel Works grew rapidly. By 1928, two new blast furnaces—Nos. 5 and 6—had been put into operation at the Fairfield plant. In order to meet the increased fuel requirements brought about by the addition of the two blast furnaces, it was necessary to build a new battery of 63 coke ovens at the by-product coke plant.

The company now turned once again to the task of adding new finished products. By the following year there had been



The three huge blast furnaces at the Fairfield Steel Works have a combined daily iron making capacity of over 4,000 tons. There are six additional blast furnaces at the Ensley Steel Works.

completed at the Fairfield steel plant a cotton tie and hoop mill. This mill, a continuous train of rolling stands served by a continuous reheating furnace, converts billets into strip. This material may be sold in coils or cut to suitable lengths, on accessory equipment in line with the mill stands, for use as cotton bale ties. The division also makes buckles, which are used to fasten the ties around cotton bales.

This mill is one of the world's largest producers of cotton tie and binding strip.

Marked changes were made in both the physical and business structure of TCI during 1929. The old Ensley Land Company, which had been organized by Col. Enoch Ensley, when he was president of TCI, conveyed all of its property to the Tennessee Land Company, a subsidiary of the steel company, and as mentioned earlier, the equipment and facilities of the Fairfield Car Works were sold to the Pullman Car Manufacturing Company. With the completion of the two new blast furnaces at Fairfield, it became practical to dismantle some of the older, less efficient furnaces, which were not centrally located. The historic Alice and Oxmoor Furnaces and the Bessemer furnaces fell victim to progress, leaving the company's iron making facilities centered at Ensley and Fairfield.

During the early 1930's, TCI suffered, as did most American business organizations, the effects of the severe economic depression which gripped the whole world after the collapse of the stock market. Demand for steel shrank to a mere fraction of its previous level, and it was necessary to curtail production severely. However, under Herbert C. Ryding, who became president in 1930, and Robert Gregg, his successor in 1933, the company took every practical measure to lessen the blow for its employees. Such work as was available was divided as equitably as possible among the employees, so that many

Herbert C. Ryding was president of TCI during the depression period of 1930 to 1933. Despite a great reduction of steel sales, many plant facilities were modernized and new sources of raw materials developed.

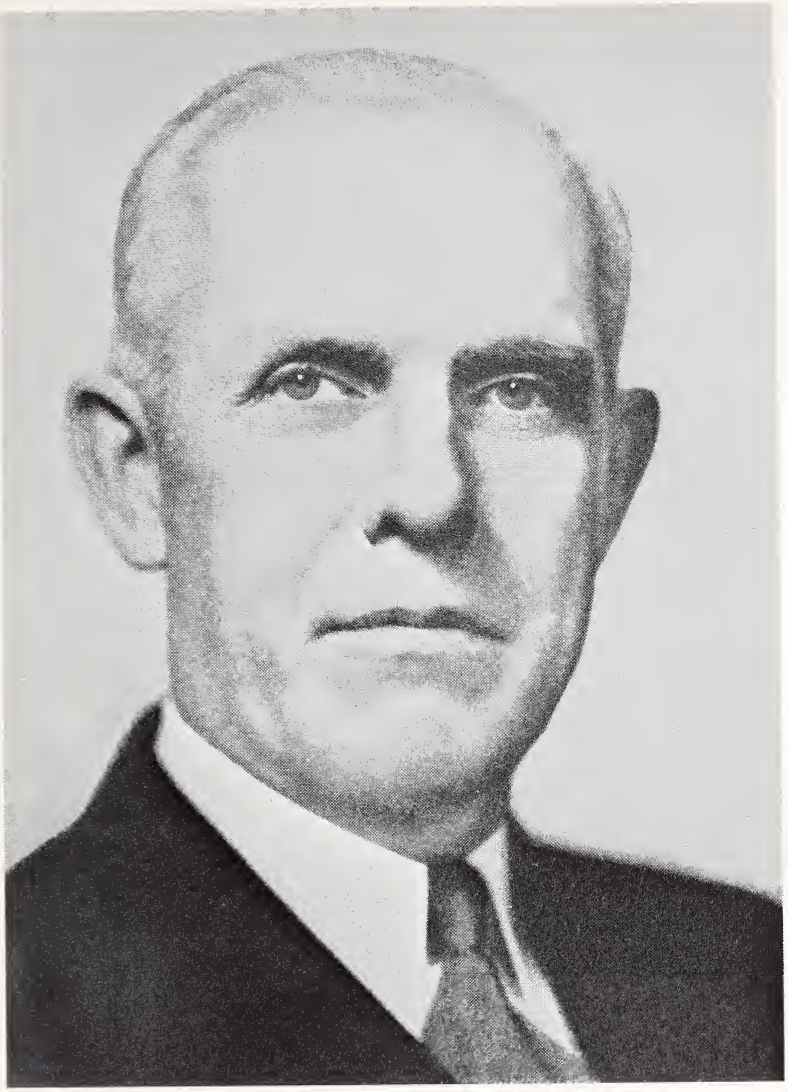
enjoyed at least partial employment during the gloomiest period of crisis.

Even as it effected necessary retrenchments, the company was looking to the future, when it would again be called upon to meet the needs of Southern manufacturers. In 1930, the sheet mill was enlarged and modernized, a new 42-Inch Universal Strip Mill was installed, and another open hearth furnace was constructed at Fairfield. In 1932, improvements were made in the finishing facilities of the bar mill and the structural mill. In 1933, the company acquired from its sister subsidiary of United States Steel, the American Steel and Wire Company, the Fairfield Wire Works, which had been erected in 1912. Three years later, additional finishing facilities were installed at the 110-Inch Plate Mill, and additional equipment was provided at the sheet mill. By increasing the capacity for sheet production, TCI showed its recognition of a trend toward greater use of this material, and thus kept itself at the forefront in Southern industrial development.

Robert Gregg vacated the presidency of TCI in 1935, to assume a responsible position with the parent corporation, and was succeeded at Birmingham by John Lester Perry.

It would be well to point out here that, with TCI operating according to policies developed jointly with the United States Steel Corporation, changes in top management no longer bring with them the great revisions of financial policy, operational procedure and personnel which had been a part of shifting management in earlier days. Long-range programs can now be formulated on a more sound basis.

Organizational changes in 1936 included the dissolution of the Chickasaw Utilities Company. Also in that year, TCI assumed the administration of United States Steel's Universal Exploration Company, of Jefferson City, Tenn. This organization mines zinc ore and processes it for the development of



John Lester Perry was TCI's president from 1935 until 1938, when he was transferred to another United States Steel division.

high grade zinc concentrate. Later, Universal Exploration was to become an integral part of TCI, known as the Zinc Mines.

Tin plate, used in the manufacture of a variety of items, the chief of which is food containers, has in modern times assumed tremendous economic importance in America. In 1936, United States Steel determined to construct a new tin plate plant, and officials at TCI convinced the corporation management that the Birmingham area was the most logical site for such an operation.

The South, with its long growing seasons and its many truck farms, supplies a large proportion of the nation's vegetables and fruits. This makes it ideal for the location of canneries and, consequently, of can manufacturing plants. Since tin plate is approximately 99 per cent steel, consisting of a steel sheet which has been coated with thin, protective layers of tin, a tin mill consumes large quantities of steel. TCI could supply that material from its own furnaces and rolling mills.

It was agreed in 1936 that a mill for the production of cold reduced tin plate, the first in the South, would be erected adjacent to the Fairfield Steel Works. By 1938, the Fairfield Tin Mill was finished and was put into operation. Today this mill consumes a considerable portion of the primary steel manufactured by TCI.

During the year, the company took further steps toward the mechanization of its coal mines, with mechanical conveyors being installed at four mines.

In 1938, Robert Gregg returned to the presidency of TCI. He remained in that position until he reached retirement age. When he retired, he moved to Gainesville, Fla., where he accepted a position as lecturer in the School of Engineering at the University of Florida.

Robert Gregg, who began his career in the steel business as an open hearth helper, served twice as president of TCI – from 1933 to 1935 and from 1938 to 1951.

Twenty Years of Growth
1939 – 1959

THEN CAME World War II, and a new word was added to vocabularies of people around the world. A highly mechanized German army made obvious the meaning of "blitzkrieg" when it swooped into Poland against brave but ineffectual resistance. Even though the United States retained a non-belligerent status for two years after the outbreak of war, American industry rapidly geared itself to wartime production, not only as a matter of self-defense, but to supply the Allies with the material means of resistance against the powerful Wehrmacht.

The South, with its large supply of manpower and abundance of natural resources, experienced tremendous industrial development as a result of the conversion to war production. TCI, by far the largest producer of primary steel in the region, was called upon to supply huge quantities of its products to Southern manufacturers for the making of defense items which ranged from artillery shells to merchant ships. TCI raised its production to 100 per cent of capacity in the autumn of 1939.

The construction and enlargement program already planned and under way was hastened, and plans were made for still further increases in production. The erection of an ore conditioning and sintering plant at Wenonah had already been authorized, and this project had advanced well toward completion. However, an enlargement of this plant was authorized in 1940, even before the finishing touches had been applied to the original facilities. At the ore conditioning plant, run of mine ore is assembled from the various mines where it is crushed and divided according to size. Then the fine particles are fused into lumps in a process called sintering, and ore of various sizes and chemical grades is blended to provide raw

material of desired size and metallurgical specifications for the blast furnaces.

Also in 1940, authorization was granted for a third blast furnace at Fairfield, which was to be known as No. 7 Blast Furnace. Nos. 5, 6 and 7 Blast Furnaces at Fairfield are so numbered because of their location in the area set aside for blast furnace construction. Space for other furnaces was originally provided, and furnace sites one through four have not yet been used for that purpose.

Blast Furnace No. 7, at the time of its construction, was the largest of TCI's furnaces. It has in later years been enlarged and has become one of the largest in the nation.

Other installations during the war included a 140-inch plate mill, at the Fairfield Steel Works, a shell forging plant at Ensley works and additions to the tin and sheet mills.

The company purchased, in 1941, a small blast furnace at Holt, Ala. This furnace was reconditioned and put into production of merchant iron. It was retired after the war.

The Short Creek Coal Mine was opened in this period and additional power equipment, including a 25,000 K.V.A. generator, was installed at the Fairfield Steel Works.

Especially noteworthy was the installation of a new tin plating process at the Fairfield Tin Mill.

Vast shipments of food to troops overseas substantially increased the demand for containers manufactured from tin plate. A great quantity of the metal was used as an alloy in making armaments. At the same time, the nation's normal supply of pig tin was drastically reduced because of Japanese aggression in and around the Pacific islands, where much of the world's tin is mined. As a result, the cost of this strategic material soared. It therefore became necessary to devise a means whereby tin plate of high quality could be manufactured with the use of considerably less tin. Thus was developed

the electrolytic tinning process. In this process, largely developed by United States Steel, tin is applied to steel strip by electroplating, much in the same manner that silver is plated on baser metals in the manufacture of some tableware.

TCI installed two electrolytic tinning lines, each of which, in one continuous operation, converts coils of steel strip into sheets of tin plate, all electronically inspected to maintain high quality, automatically counted and automatically stacked in bundles of the proper number.

With the cessation of hostilities, the demand for steel did not decrease. To the contrary, it greatly expanded with reconversion to civilian production. High employment and high wartime wages had put more money in the hands of the consuming public than ever before. During the period of total war production, when goods for civilian use had not been available, this had accumulated in government bonds and savings accounts. Thus the average person was now financially able to avail himself of conveniences and luxuries which never before had been within his reach. That, coupled with the fact that during the war such personal belongings as automobiles and household appliances which became worn and obsolete could not be replaced until the return of peace, created an overwhelming demand for all types of steel.

The impetus given to Southern industrial development during the war has brought hundreds of new manufacturers in the field and expanded the operations of others. Many of these have been looking to TCI to supply them with steel for their manufacturing and fabricating operations.

Simultaneously with its efforts to rehabilitate and replace equipment that had deteriorated and become obsolescent during the war, TCI undertook still another broad expansion program in the immediate postwar period. In 1946, work was begun on the opening of the new Concord Coal Mine. This

The sole purpose of this huge plant, tall as an 11-story building, is to wash coal from TCI's Concord Coal Mine, in order to separate useful fuel from waste rock.

modern, highly mechanized mine is the largest producer in Alabama. A tenth open hearth furnace was installed at the Fairfield Steel Works. The Fairfield Sheet Mill was almost entirely rebuilt, with facilities being installed for the production of high quality cold reduced sheets. The first producer of cold reduced sheet in the South, this mill is producing a variety of material suitable for the manufacture of many commodities which previously could not be manufactured practically from Southern-made steel sheets. At the sheet mill also, old type pot galvanizing machines were replaced by continuous galvanizing lines.

At both coal and ore mines, modern mechanical loading, transportation and conveyor equipment has been installed.

Of greater importance than might be apparent on superficial observation has been the replacement of conventional timbering in TCI's mines by a method called roof bolting. TCI was a pioneer in the practice of roof bolting in coal and iron ore mines. This method of roof support consists of placing expansion bolts in holes drilled upward in the roof. The bolts tie roof strata together in such a way as to cause the roof to form its own support. The practice has greatly lowered the incidence of rock falls, with consequent reduction of hazard to underground personnel and equipment.

As the postwar expansion program advanced, it grew in scope. Two more open hearth furnaces were added at Fairfield. These were of 220 tons capacity. The 10 furnaces already in existence there were enlarged to that capacity, and auxiliary equipment, such as soaking pits and cranes, was augmented. A third continuous galvanizing line was installed at the sheet mill, and additional warehouse space was provided there.

To raise the iron output needed for the additional steel making facilities, it was decided to supplement the comparatively low grade Red Mountain ore with imported ores of

Arthur V. Wiebel became president of TCI in 1951.

greater iron content. To facilitate importation of the high-grade raw material, TCI built an ore terminal at Mobile, Ala., and again expanded its ore handling facilities at Wenonah.

In 1953, TCI's rated capacity amounted to 3,455,000 net ingot tons per annum. At the beginning of 1954 its annual rated capacity was officially placed at 3,831,000 tons.

Since 1954, TCI has continued to modernize and augment its production facilities as technological advancement and customer requirements warranted. At almost all of its various works, equipment has been installed to produce new types and dimensions of steel, or products of a higher quality. Official rated capacity has been increased still further, to 3,997,000 net ingot tons as of January, 1960.

At the Fairfield Steel Works, auxiliary facilities have been installed to boost the productive capacity of the plate mill by 20 per cent. At the Fairfield Wire Works, equipment has been installed for the manufacture of three new products: ACSR core wire, for use in making electrical cable; high tensile tying wire, for use in packaging and baling; and electric welded wire mesh, useful as a reinforcing material in building construction, concrete pipe and paving highways and airport runways.

Many modernization projects have been undertaken at the Fairfield Tin Mill. Additional equipment for the manufacture of electrolytic tin plate has been installed. It is now possible to produce tin plate in a number of finishes, and actually to put a heavier coat of tin on one side of a steel sheet than on the other.

To meet can manufacturers' demands for wider sheets and strip of tin plate, facilities for the processing of wider steel strip have been added at the mill. Among these is a new and bigger pickling line, for surface treatment of the steel before it goes through the tin plating process. Also added is a newly-developed line for the continuous annealing of steel strip to

The 12 modern open hearth furnaces at TCI's big Fairfield Steel Works each have a capacity of about 220 tons per heat. Some of the furnaces are equipped with recently developed oxygen apparatus, to shorten the length of time needed to convert iron to steel.

be used in making tin plate. Steel introduced at one end of this line passes continuously through the line to be heat treated. This provides an improved product for can manufacturers. A new temper mill, used to impart good surface quality to steel strip for tin plate, was installed in the same period.

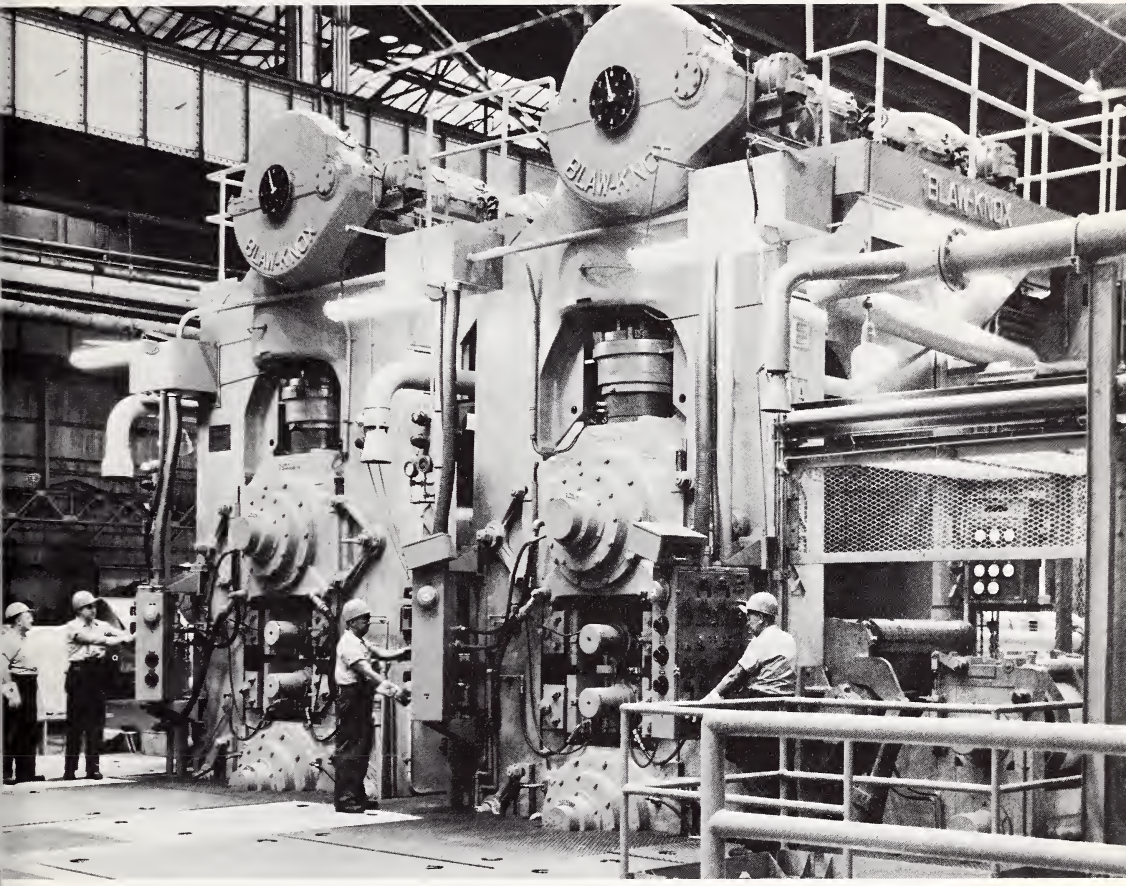
Still further additions have been made at the Ore Conditioning and Sintering Plant, including the installation of a new sintering machine to provide improved raw material, as regards physical and metallurgical properties, to feed the division's blast furnaces.

To add to the already great volume of valuable chemicals recovered from coal gas during the coking process, TCI added a tar distillation plant and tar processing facilities at its Fairfield Coke and Coal Chemical Works. Tar, previously the final residue in the separation of chemicals from coal fumes, is now further broken down to yield such valuable substances as naphthalene, creosote, solvents and special tar products, such as electrodes used in the production of aluminum.

Modernization to meet the growing and developing demands of Southern industry has been a continuous process throughout the history of TCI. That will always be the case; thus it is not possible to publish a history of the division which will long remain up to date. This volume reports on accomplishments up to the early months of 1960. Within a short time, new developments quite possibly will have taken place which will not be reflected here.

To report the full story of TCI, it is necessary to record the recurrence of three types of events which had taken place many times during its century of existence — changes of name, charter and top management.

In 1945, the Tennessee Coal, Iron and Railroad Company relinquished its Tennessee charter and received a new charter from the State of Alabama.



Evidence of continuing progress at the Tennessee Coal & Iron Division is this big temper mill, installed at the Fairfield Tin Mill shortly before TCI reached the century mark.

In 1951, Robert Gregg retired from the presidency of TCI after a long and fruitful career in the steel industry. He was succeeded by Arthur V. Wiebel, who had come to the company in 1946 as vice president, from United States Steel's Northern operations.

On January 1, 1952, the corporate structures of certain subsidiaries of United States Steel Corporation were revised, and the Tennessee Coal, Iron and Railroad Company became the Tennessee Coal & Iron Division of the United States Steel Company.

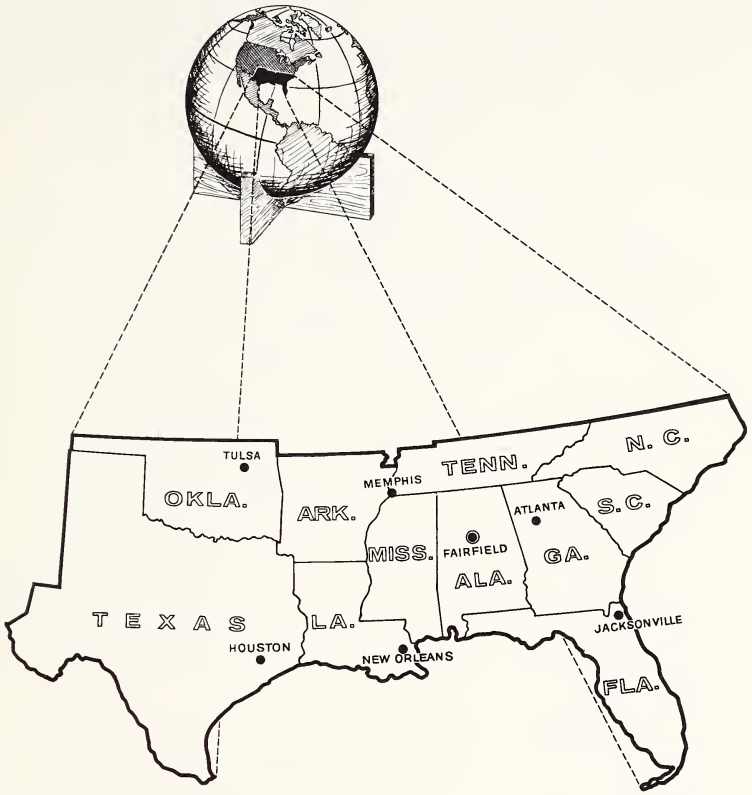
Exactly one year later, United States Steel Company was merged with United States Steel Corporation, and the latter for the first time became an operating company. TCI became the Tennessee Coal & Iron Division of United States Steel Corporation.

But the familiar initials by which the company was so long identified have been carefully preserved. And TCI is advancing with vigor and confidence into its second century.

With close to half of the steelmaking capacity of the 11 Southern and Southwestern states in its trade territory, TCI affords a major support for Southern industrial growth and diversification. Its range of products is almost as wide as that of any single steel producer in the world, encompassing almost 100 products, co-products and by-products of steel. These form the basis of operation for many independent fabricators of consumer goods, provide a major source of materials for the rapidly growing construction industry and supply farmers and homeowners with such useful items as sheet metal roofing and siding, wire fence, nails and staples.

In addition to the many thousands of jobs directly provided in TCI's mines, plants and offices, the division makes jobs for many thousands of other people throughout the South, who work for industries which use its products in their own

TCI TRADE TERRITORY 1960

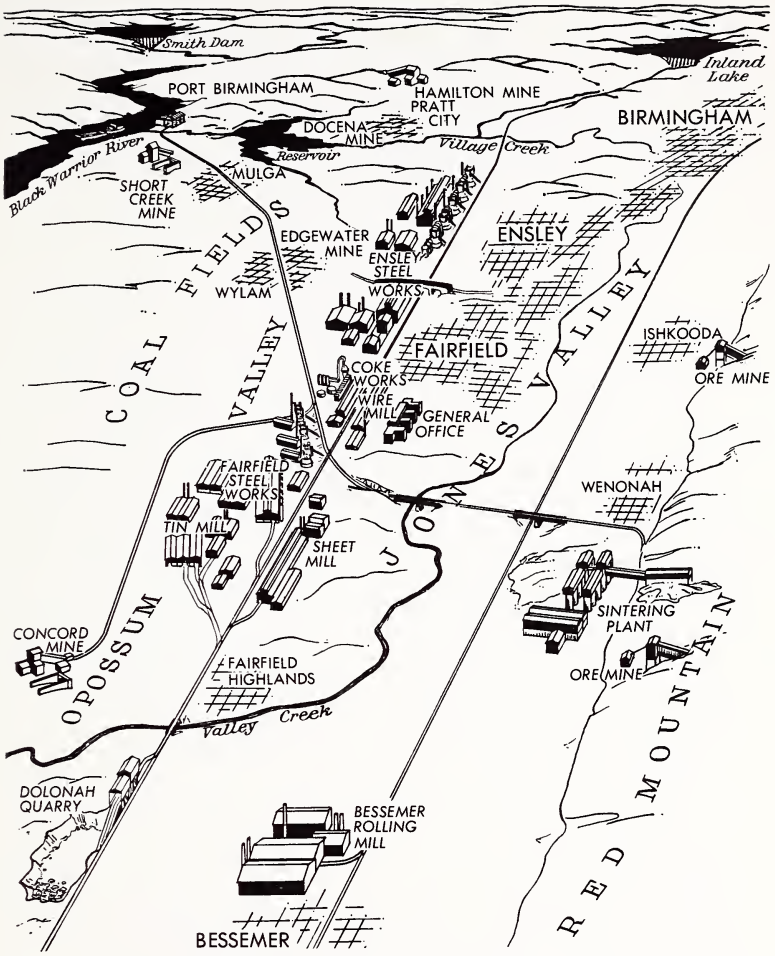


With an annual rated ingot capacity of approximately four million net tons, TCI was a major supplier of steel and allied products to fabricators, builders and warehousemen in 11 states by 1960. Its almost 100 items of manufacture comprised one of the widest and most varied product lines of any steel producer in the nation.

operations, or who supply the division with the many, many millions of dollars worth of goods and services it purchases each year.

TCI is growing, and the South is growing. Together they can advance into a new era of prosperity which will make past accomplishments look small by comparison.

BIRMINGHAM AREA 1960



As TCI reached the century mark, its mines and plants dominated the western industrial section of the Birmingham district. Almost entirely located in Alabama, it was the South's largest steel producer and the biggest industrial employer in the state.

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